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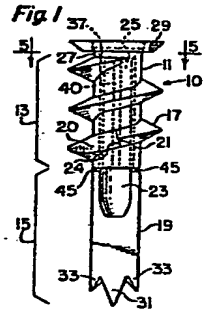
(54) **Insert for a drywall.**

(57) A threaded insert (10) for a drywall (42) has an externally threaded portion (13) and an unthreaded drilling portion (15) of generally equal lengths. The insert (10) is adapted to be installed in a single step with the use of a hand powered screwdriver. A low profile flange (29) at the upper end spaced a distance from threads (17) allows the insert to be installed flush with the surface of the drywall (42). The drilling portion (19) can be deflected laterally upon the insertion of a screw (50) allowing the use of a single moderate length screw (50) for attaching articles of various thicknesses. The insert may be moulded from zinc (Figure 1) or plastic material (Figure 7). The insert eliminates the need to pre-drill a hole in the dry wall (42) with a separate tool.

Fig 1



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Insert For A Drywall

The present invention relates to an insert, and particularly to an insert for use in drywall or sheetrock construction. Because drywall is a friable gypsum based material, fastening articles to it is difficult. Generally, two different methods are used. For light weight articles, plastic expansion anchors are commonly used. Such anchors require three steps to install them. First, a hole is drilled into the drywall. Then, the insert is pushed into the hole. Finally, a threaded fastener is advanced into the anchor spreading the anchor into engagement with the drywall. Typically such anchors include a generally hollow cylindrical body with a flanged end.

For heavy duty applications, toggle bolts are generally used to attach articles to a drywall. While toggle bolts are generally effective, they are also generally expensive because they involve a plurality of parts which must move relative to one another. Another disadvantage of toggle bolts is that they sometimes present difficult installation problems, particularly in the sequence of assembly.

According to this invention the body of such an anchor has an exterior thread and a drilling end, the drilling end including means for allowing passage of an elongated fastener through the body and beyond the drilling end.

The present invention avoids a separate drilling operation and provides an anchor which is simple to install and inexpensive to manufacture. It also has improved pullout resistance compared to light duty

plastic anchors, and is significantly cheaper and easier to install than toggle type anchors.

Preferably the drilling end has a maximum lateral dimension substantially equal to the root diameter of the threaded portion, and the crest diameter of the threaded portion is preferably substantially twice that of the root diameter. These two features are important to achieve a proper threaded connection in the drywall. Because drywall is made of a weak friable material, a high thread is needed to transfer pull-out forces to as much of the material as possible. By making the width of the drilling portion equal to the root diameter of the threaded portion, the drilling operation removes only as much material as is necessary, leaving behind a maximum amount of workpiece material for thread engagement.

The threaded and drilling portions are preferably generally equal in length to each other, and are generally equal in length to the thickness of standard drywall material. This configuration allows the drilling operation to be completed prior to the start of thread formation in the drywall. Since axial advancement of the insert is significantly slower in the drilling operation than in the thread forming operation, it is necessary that these operations not be performed simultaneously. However, a distinct advantage of the insert of the present invention is that these two operations can be performed in a single step or motion without the need to pre-drill a hole in the drywall with a separate tool.

Two embodiments of anchors in accordance with this invention will now be described with reference to the accompanying drawings, in which:-

Figure 1 is a side elevation of a first embodiment;

Figure 2 is a front elevation taken from the right side as shown in Figure 1;

Figure 3 is a plan view;

Figure 4 is an under plan view;

Figure 5 is a sectional elevation taken along the line 5-5 shown in Figure 1;

Figure 6 is a partially sectioned side elevation showing the first embodiment installed in a workpiece;

Figure 7 is a side elevation of a second embodiment;

Figure 8 is an underplan of the second embodiment;

Figure 9 is a rear elevation of the tip of the second embodiment taken from the left side of Figure 7;

Figure 10 is a sectional elevation taken along the line 10-10 shown in Figure 7; and,

Figure 11 is a partially sectioned side elevation showing the second embodiment installed in a workpiece.

Referring now to the drawings wherein like parts are designated by the same numerals throughout the various Figures, Figures 1 to 6 illustrate a first embodiment which is moulded from zinc. The insert 10 is comprised of a cylindrical body 11 on which is disposed a high thread 17. A flange 29 is disposed at one end of the body and a flat drilling portion or blade 19 is disposed at the other end thereof. An axial bore 25 extends through the cylindrical body 11 and communicates with a spoon-like opening 23 in the blade 19. The thread 17 is separated from the flange 29 by the space 27. The axial length 13 of the threaded portion of the cylindrical body is generally the same as the axial length 15 of the drilling portion 19. The thread 17 includes notches 20. The notches form a generally radial surface 24 bounded by cutting edges 21. At the juncture of the threaded portion and the drilling portion, weakening slots 45 facilitate the lateral deflection of the blade 19 when a threaded fastener is driven through the threaded insert. The spoon-like opening 23 forms a curved wall 35 which guides the tip of a fastener driven through the insert.

The drilling operation used to install the threaded insert is intended to be achieved with a hand-powered Phillips screwdriver. Figure 3 shows the Phillips recess formed in the upper end of the first embodiment. Four slots 37 are formed in the bottom of the recess 39 in the upper end of the insert. The hole forming configuration of the first embodiment is shown in Figures 1, 2 and 4. A central spike 31 is formed at the extreme end of the blade 19 and the spike 31 extends beyond the peripheral spikes 33. The spike 31 tends to maintain the location of the insert during drilling, while the spikes 33 tend to neatly cut the paper covering which is used on the surface of drywall. After the paper is cut, the spikes 31 and 33 continue to form a bore in the drywall as the anchor is rotated. After the drilling operation is completed, the thread 17 begins to form a mating thread in the drywall material. The cutting edges 21 assist in the formation of the threads in the drywall.

Figures 3 and 5 show the splines 40 on the interior of the bore 25. Depending on the hardness of the material comprising the insert and the crest diameter of an associated threaded fastener, the height and shape of the splines can be varied.

Figure 6 shows the threaded insert as it appears when fully installed. The threads 17 of the insert are engaging the drywall 42. The upper surface of the flange 29 is flush with the outer surface 43 of the drywall 42. This flush condition is obtained by the use of a low profile head 29 and by the presence of the space 27. The discontinuation of the thread 17 before reaching the head 29 creates a space in the thread form in the drywall material which allows compression of adjacent material by the flange 29, and which, therefore, allows the uppermost surface of the flange 29 to be flush with the outer surface 43 of the drywall.

In Figure 6 it can also be seen that the insertion of the threaded fastener 50 through the insert causes the blade 19 to deflect laterally. The deflecting feature of the drilling portion is beneficial in that it allows the use of a screw which has a predetermined length regardless of the thickness of the material 44 being fastened.

Another feature of the present invention is that the break-off nature of the blade 19 can be used in an alternative way. Occasionally, drywall is placed over much harder surfaces such as concrete or cement block. In such applications, it is often the case that a small amount of space, generally less than 3/4", lies between the back of the drywall and the surface of the supporting structure. When this is encountered, the insert of the present invention can be used in the following manner.

A hand powered screwdriver together with the insert 10 are used to form a hole in the drywall. Once the hole is formed the insert is removed. The blade 19 can then be manually broken off at the location of the weakening slots 45. The insert can then be threaded into the drywall 42, without any danger of the blade 19 contacting the supporting structure.

Figures 7 through 11 show a second embodiment of the present invention. The second embodiment is a plastics moulded threaded insert 60 comprised of a generally cylindrical body 61 and an external thread 67 disposed thereon. An elongated drilling tip 69 is formed at one end of the body and a low profile flange 79 at the other end. The thread 67 stops before reaching the flange 79 forming an unthreaded neck 77. The length 63 of the threaded portion is generally equal to the length 65 of the drilling tip 69. A bore 75 extends from the flanged end of the insert into the drilling tip 69. As in the first embodiment, the flanged end 79 includes a recess 89

and slots to receive a Phillips driver. The drilling tip 69 is comprised of a conical point 74 and a flat surface 72. A web 73 closes off the bore 75, and prevents dust from entering the bore during the drilling operation.

Figure 8 shows the drilling end of the insert 60. The conical point 74 is comprised of a generally conical surface 79 and flat surface 72. The cutting edge 76 forms a first angle A1 with the axial portion of the drill tip 69, and the trailing edge 78 forms a second angle A2 with the axial portion of the drill tip 69. Angle A1 is greater than angle A2 in order to ensure that the cutting edge 76 contacts the drywall during the drilling operation. The generally conical surface 79 slopes in the direction of the flanged end from the cutting edge 76 to the trailing edge 78. The sloping surface 79 is not purely conical, but forms a generally helical edge 77 at the intersection of the surface 79 and the axially oriented surface 70.

Figure 10 is a sectional view showing splines 90 on the interior of the cylindrical body 61. Since the second embodiment is moulded plastic material, the splines 90 may be thicker and more numerous than the splines 40 of the first embodiment, because most plastic materials are softer and more easily tapped than a moulded zinc material.

Figure 11 is a sectional view showing the insert in its installed position in a drywall workpiece 92. As in the first embodiment, the drill tip 69 allows axial penetration of the fastener 80. The threads 82 disposed on the shank 85 engage the splines 90. Because the article 94 is thin, the tip of the fastener 80 penetrates the wall 73 causing lateral deflection of the tip 69. However, a thicker article could be fastened with the same screw, in which case the screw may not penetrate the wall 73. The threads 67 engage the drywall material 92,

and the flange 79 is flush with the outer surface 93 of the workpiece 92.

CLAIMS

1. An anchor (10) for use in friable material including a generally hollow cylindrical body (13) with a flanged end (29), characterised in that the body (13) has an exterior thread (17) and a drilling end (15), the drilling end (15) including means (23, 45, 73) for allowing passage of an elongated fastener (50, 80) through the body (13) and beyond the drilling end (15).

2. An anchor according to claim 1, wherein the flanged end (29) includes a Phillips-type drive recess (37) axially spaced inwardly of the flanged end (29).

3. An anchor according to claim 1 or 2, wherein the thread (17) is spaced from the flanged end (29) by an amount less than one pitch of the thread (29).

4. An anchor according to anyone of the preceding claims, wherein the drilling end (15) has an axial length generally equal to that of the body (13), whereby drilling of the material (42) by the drilling end (15) is substantially completed prior to engagement of the thread (17) with it.

5. An anchor according to any one of the preceding claims, wherein the thread (17) includes at least one interruption (20) having a generally radially flat surface (21) for performing a thread cutting operation.

6. An anchor according to any one of the preceding claims, wherein the threaded portion of the body (13) has a root and crest diameter such that the crest diameter is generally twice that of the root diameter.

7. An anchor according to any one of the preceding claims, wherein the drilling end (15) is generally flat and pointed (19) and includes spoon-like means (23) for engagement with the fastener (50) and a weakened zone (45) for allowing the drilling end (15) to deflect upon engagement of the fastener (50) with the means (23) and

subsequent advancement of the fastener (50) through the body (13).

8. An anchor according to any one of claims 1 to 6, wherein the drilling end (65) includes a generally conical point (74) having a flattened side (72) formed by a frangible wall (73) substantially closing the hollow inside of the body (60) at the drilling end (65), the wall (73) being penetrable by the elongate fastener (80) to permit the passage beyond the drilling end (65).

9. An anchor (19) for use in friable material (42) comprising a generally cylindrical body with a flanged end (29) and a drilling end, said flanged end (29) having torque transmitting surfaces (37) therein, an external thread (17) on a portion (13) of said body, said portion (13) having a crest diameter generally twice its root diameter, and said portion (13) having a predetermined axial length, a drill tip (15) depending from said portion (13) having an axial length generally equal to the length of said threaded portion (13), said tip (15) comprising a generally flat blade (19) having an opening (23) at one end thereof communicating with a bore (25), said blade (19) having a maximum lateral dimension generally equal to said root diameter, said blade having a free end including three spikes (31, 33), one of said spikes (31) being centrally located with respect to the axis of said body, the others (33) of said spikes having points spaced at a distance generally equal to said root diameter, the centrally located spike (31) extending further from said body than said others (33), said blade (19) being frangibly connected (45) to said body.

10. An anchor (60) for use in friable material (92) comprising a generally hollow cylindrical body (63) having a central bore (75) and an external threaded portion (67) having a predetermined axial length, a drill tip (69) at one end of said body (63) and a flange (79)

at the other end thereof, said drill tip (69) including a generally cylindrical portion (70) adjacent said threaded portion (63), and a generally conical point (74) having a flattened side (72), said side (72) forming a frangible wall (73) substantially closing off said bore (75) at said drilling end (69), said wall (73) being penetrable by an elongated fastener (80), said conical point (74) being deflectable to a non-axial position upon insertion of said fastener (80) through said anchor (60), and including a curved surface (79) generally opposite to said flattened side (72), said curved surface (79) being bounded by a first cutting edge (76) and a second trailing edge (78), and a thick curved helical edge (71) defined by an intersection between said curved surface (79) and said cylindrical portion (70) of said tip (69).

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Fig.1

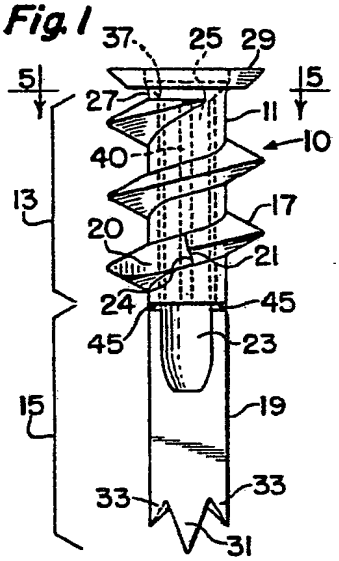

Fig.2

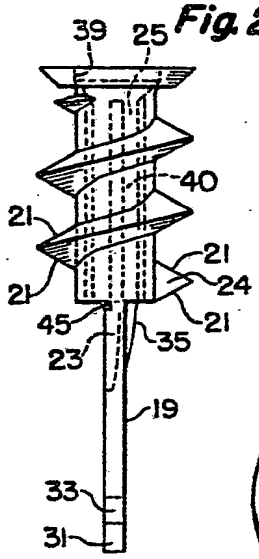

Fig.3

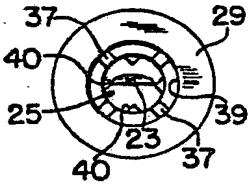

Fig.4

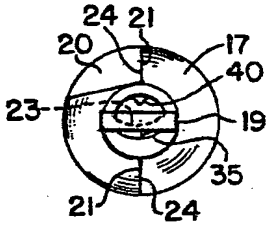

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Fig.5

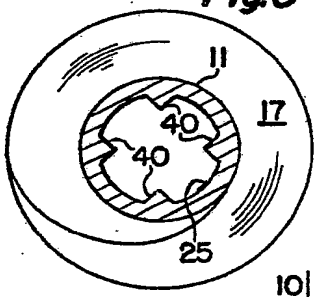


Fig.6

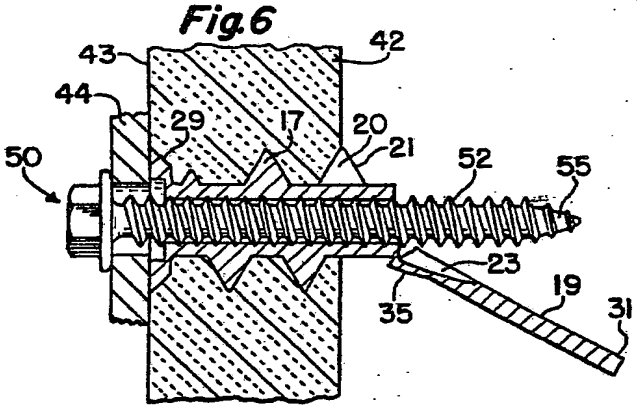


Fig.7

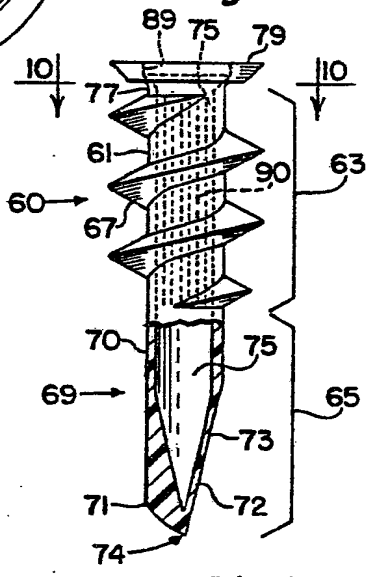


Fig.11

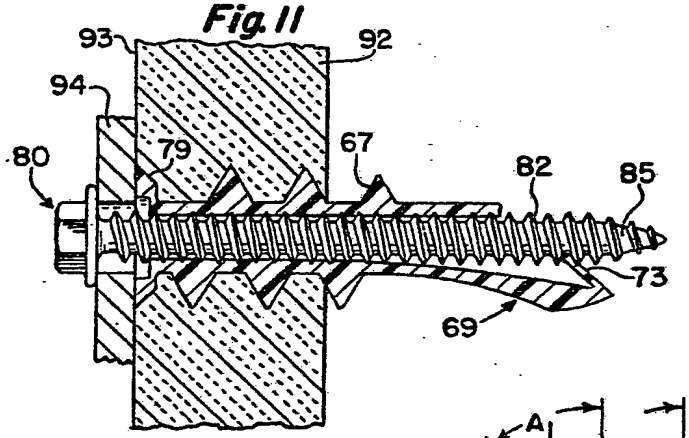


Fig.8

Fig.9

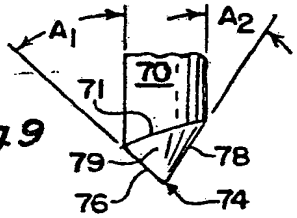
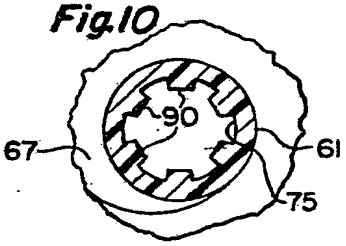


Fig.10



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EUROPEAN SEARCH REPORT

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Application number

EP 85302832.2

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int Cl 4)
A	AT - B - 239 505 (DIPL.-ING. WERNER REIN) * Fig.; claim 1 *	1	F 16 B 13/04
A	US - A - 4 430 033 (ARTHUR J. MC KEWAN) * Abstract *	1	
A	US - A - 3 832 931 (MARYAN TALAN) * Abstract *	1	
A	EP - A1 - 0 064 166 (HILTI AKTIEN-GESELLSCHAFT) * Abstract; fig. *	1	
A	DE - A1 - 3 122 503 (HILTI AG) * Abstract *	1	TECHNICAL FIELDS SEARCHED (Int. Cl.4) F 16 B
A	US - A - 3 516 324 (ALBERT BERNER) * Fig.; claim 1 *	1	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
VIENNA	03-07-1985	REIF

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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